

L 5158-66

09010463

ACC NR: AT6000086

nification seismometers (SKM-3 and USF-III-M), and in the 0.2-10-sec range with intermediate magnification seismographs (SK-3) (photograph of N-001, schematics of N-001, kinematic circuit, and electrical circuit are shown). Orig. art. has: 6 figures. [FSB: v. 1, no. 5]

SUB CODE: ES, EC / SUBM DATE: none / ORIG REF: 002.

L 5157-66 EWT(1)/ERC(k)-2/EWA(h) GW
ACC NR: AT6000082

SOURCE CODE: UR/2619/64/000/035/0013/11

AUTHOR: Borisevich, Ye. S.; Kastorskiy, S. A.; Mosyagina, M. S.
44,55 44,55 44,55

ORG: Institute of Physics of the Earth im. O.Yu. Shmidt, AN SSSR (Institut fiziki zemli AN SSSR)
44,55

TITLE: Modernized OSB- VI- M seismic oscillograph
25 44,55

SOURCE: AN SSSR. Institut fiziki zemli. Trudy, no. 35, 1964, 43-48

TOPIC TAGS: seismography, seismologic instrument, oscillograph, galvanometer,
seismologic station 44,55,12 44,65,12 10

ABSTRACT: This oscillograph was designed for use in the field or at a seismic station. It can also be used to record other low-frequency processes. Six galvanometers of either the GB-III-B-5 or GB-III-BS-2.5 types are used. Recording is on paper 280 mm wide with a usable length of 900 mm. The drum rotates at 15, 30, 60, 120, 240, and 480 mm/min. Seismometers recommended for use with this oscillograph are listed, and their parameters are tabulated (SKM-3, USF-III-M, SVK-3, and SGK-3 seismometers). Photographs of instrument, and schematic of seismometer-galvanometer connection are shown. Orig. art. has: 5 figures, 3 tables, 1 formula. [FSB: v. 1, no 5]

SUB CODE: ES, EC / SUBM DATE: none

Card 1/1 *h2*

L 5188-66 EMT(1)/EWA(h) GW

ACC NR: AT6000080

SOURCE CODE: UR/2619/64/000/035/0030/0035

AUTHOR: Borisovich, Ye. S; Preobrazhenskiy, V. B.; Stepanov, V. V.

42

ORG: Institute of Physics of the Earth im. O.Yu. Shmidt, AN SSSR (Institut fiziki zemli AN SSSR)

TITLE: N-002 three-channel seismic pen-recorder

SOURCE: AN SSSR. Institut fiziki zemli. Trudy, no. 35, 1964, 30-35

TOPIC TAGS: seismograph, seismologic instrument, seismography, electronic circuit

ABSTRACT: This is a hot-pen recorder which was developed and tested at the "Vibro-pribor" Plant and which assures clear records of seismic vibrations in the range from 0 to 3 cps at a double amplitude of up to 20 mm. This instrument was designed for use as the recorder for capacitance or magneto-electric seismographs using UPN amplifiers (schematics for principal circuit, kinematic circuit, electrical circuit, photograph of instrument, and diagram of hot pen are given). Orig. art. has: 5 figures, 1 table. [FSB: v. 1, no. 5]

SUB CODE: ES, EC / SUBM DATE: none / ORIG REF: 002

Card 1/1

09010457

USSR/Zooparasitology. Parasitic Worms

G

Abs Jour : Ref Zhur-Biol., No 13, 1958, 57869

Author : Borisevich Z. M.

Inst : Smolensk State Pediatric Institute

Title : On the Dynamics of the Fauna of Phytonematodes
of some Farm Crops and on the Factors of its
Modification

Orig Pub : Uch. zap. Smolenskovo gos. ped. in-ta, 1957,
vyp 4, ch. 2, 101-103

Abstract : No abstract

Card 1/1

BORISEVICH, Z.M.; USHAKOVA, T.N.

Practical work of the sixth grade students on the topic "Control of insect garden pests." Biol. v shkole no.2:29-33 Mr-Apr '63. (MIRA 16:4)

1. Smolenskiy pedagogicheskiy institut (for Borisevich). 2. Bazovaya shkola No.27 Smolenskogo pedagogicheskogo instituta (for Ushakova).
(Insects, Injurious and beneficial—Control)
(Entomology—Study and teaching)

BORISEVICH, Z.S.

Translation from: Referativnyy Zhurnal, Elektrotehnika, 1957, Nr 2, p. 93 (USSR) 112-2-3169
AUTHOR: Borisevich, Z.S.
TITLE: Replacing the Cast Cable Binding Clip on the Lead-In Devices of
Electrical Apparatus by a Clip Pressed from Sheet Steel (Zamena
litoy skoby dlya zazhima kabelya v vvodnykh ustroystvakh
apparatov na shtampovannuyu iz listovoy stali)
PERIODICAL: Sb rats. predlozheniy. M-vo elektrotekhn. prom-sti SSSR, 1955,
Nr 55, pp. 33-34
ABSTRACT: Bibliographic entry
Card 1/1

~~BORISEVICH, S.S.~~ inzhener.

Assembly characteristics of flange-type electric motors. Vest.
electroprom. 27 no.7:65-67 J1 '56. (MLRA 10:8)

1.Zavod "Kizlaselektromotor" Ministerstva elektrotekhnicheskoy
promyshlennosti.

(Electric motors)

KHORUNZHIY, V.A.; red.; RIBAS, Yu.M., red.; BORISEVICH, Z.S., red.;
VERTYACHIKH, V.G., red.; KOST'YEV, N.K., red.; MOVSESOV, N.S.,
red.; ZHIGULIN, Yu.V., red.; RAKOVICH, I.I., red.; RUVINSKIY,
V.A., red.; TULIN, V.S., red.; FETISOV, P.A., red.; FILIMONOV,
P.V., red.; IGLITSYN, I.L., red.; LARIONOV, G.Ye., tekhn.red.

[Rules for the manufacture of explosion-proof electric equipment]
Pravila izgotovleniia vzryvozashchishchennogo elektrooborudovaniia.
Moskva, Gos.energ.izd-vo, 1960. 54 p. (MIRA 13:11)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po avtoma-
tizatsii i mashinostroyeniyu.
(Electric apparatus and appliances)

NIKITIN, P.Z.; KOST'YEV, N.K.; BORISEVICH, Z.S.

Second Conference on Blastproof Electrical Equipment. Prom.energ.
17 no.5:54-55 My '62. (MIRA 15:5)
(Electric engineering—Safety regulations)
(Donetsk—Congresses)

L 35300-66

ACC NR: AP6026874

SOURCE CODE: RU/0022/66/011/002/0067/0073

AUTHOR: Borisevici, Boris (Engineer)

ORG: Hydropower Study and Planning Institute (Institutul de studii si proiectari hidroenergetice)

TITLE: Influence of non-simultaneousness of the intake flow on the choice of dimensions for the secondary delivery network

SOURCE: Hidrotehnica, gospodaria apelor, meteorologia, v. 11, no. 2, 1966, 67-73

TOPIC TAGS: waterway engineering, hydrography

ABSTRACT: An analysis of the hydrographic system resulting from the combination of a number of secondary intakes with small watersheds. The author suggests a method for the choice of proper dimensions for the secondary intakes of such a system, taking into consideration the lack of simultaneity of the intake flows. A numerical example is given. Orig. art. has: 8 figures and 3 tables. /Based on author's Eng. abstract/
/JPRS: 36,452/

SUB CODE: 13, 08 / SUBM DATE: --Jun65

Card 1/1

UDC: 627.835

09/6 2629

AFANASIEV, G.D. [Afanas'yev, G.D.]; BORISEVICI, I.V. [Borisevich, I.V.];
SANIN, L.L. [Shanin, L.L.]

Geologic interpretation of the radiological data for the determination
of the absolute age of rocks. *Analele geol geogr* 14 no.4:56-74 0-D
'62.

GIRDZIJAUSKAS, V., doktor med. nauk; VIKONYTE-VASILJEVIENE, D.,
kand. med. nauk; BORISEVICIENE, H.; KANTAUSKAS, V.;
RIMKUNAS, A., red.; ANAITIS, J., tekhn. red.

[Practical handbook of medical microbiology] Medicinines
mikrobiologijos praktinis vadovas. Vilnius, Valstybine
politines ir moklines literaturos leidykla, 1961. 431 p.
(MIRA 15:3)

1. Akademiya nauk Litovskoy SSR (for Girdzijauskas).
(MICROBIOLOGY)

LOZHKIN, Vladimir Vsevolodovich; BORISHACHSKAYA, S.S., red.;
SOLOMATINA, Z.D., red. ~~izd-va~~; GUROVA, O.A., tekhn. red.

[Determination of the minerals of placer deposits; practical
guide] Diagnostika mineralov rossypei; prakticheskoe ruko-
vodstvo. Moskva, Gos. nauchno-telchn. izd-vo lit-ry po geol.
i okhrane neдр, 1962. 242 p. (MIRA 15:2)
(Mineralogy, Determinative)

Borishanskaya, S. S. Cand. Geolog-Mineralog Sci

Dissertation: "Tellurides in the Gold-Ore Deposits of the USSR
and Their Forecasting" Moscow Geological-Prospecting Institut
S. Ordzhonikidze, 26 Mar 47

SO: Vechernyaya Moskva, Mar 1947 (Proj. # 17836)

YUSHKO, S.A.; BORISHANSKAYA, S.S.; SPIRINA, N.I., redaktor; GUROVA, O.A.,
tekhnicheskii redaktor.

[Tables for the identification of minerals in alluvial sands] Tablitsa
diagnosticheskikh priznakov mineralov v shlikhakh. Moskva, Gos. nau-
chno-tekhn. izd-vo lit-ry po geologii i okhrane neдр. 1955. 59 p.
(Mineralogy, Determinative) (MIRA 8:5)

BORISHANSKAYA, S.S.; VOSKRESENSKAYA, N.T.; KARPOVA, I.S.

Mineral shape of thallium in spalerites of the Verkhnyaya Kvasa
deposit. Nauch.dokl.vys.shkoly; geol.-nauki no.4:135-136 '58.
(MIRA 12:6)

1. Moskovskiy universitet, geologicheskiy fakul'tet, kafedra
mineralogii i geokhimii.
(Caucasus--Thallium) (Caucasus--Sphalerite)

BORISHANSKAYA, S.S.

Using the table of symptomatic metalliferous minerals in
polished thin sections. Trudy Min.muz. no.9:146-147 '59.
(MIRA 12:6)

(Mineralogy--Tables)

BORISHANSKAYA, S.S.; RAZIN, L.V.; ROZHKOV, I.S.

Colloform cuproplatinum is a rare variety of cuprian platinum.
Geol. i geofiz. no.7:50-59 '60. (MIRA 13:9)

1. Yakutskiy filial Sibirskogo otdeleniya AN SSSR.
(Platinum)

ROZHKOV, I.S.; KUTSUL, V.I.; RAZIN, L.V.; BORISHANSKAYA, S.S.; Primal
uchastiye BOGOMOLOV, M.A.; IMSHENETSIY, A.I., red. izd-va;
ASTAF'YEVA, G.A., tekhn. red.

[Platinum in the Aldan Shield] Platina Aldanskogo shchita.
Moskva, Izd-vo Akad. nauk SSSR, 1962. 118 p. (MIRA 15:5)

1. Chlen-korrespondent Akademii nauk SSSR (for Rozhkov).
(Aldan Plateau--Platinum)

BORICHANSKAYA, S.S.; KROTOV, G.A.; MAKHMUDOV, A.I.

Alloclasite from the Southern Dashkesan iron ore deposit
(Azerbaijan S.S.R.). Dokl. AN SSSR 161 no.5:1181-1183 Ap
'65. (MIRA 18:5)

1. Kirovabadzkiy pedagogicheskiy institut i Moskovskiy gosudarstvennyy
universitet. Submitted October 21, 1964.

BORISHANSKAYA, T.M., starshiy nauchnyy sotrudnik.

Studying the working methods of P.I.Markocheva and M.I.Lebedkova. Leg.prom.
7 no.9:25-26 Ag '47. (MLRA 6:11)

1. Nauchno-issledovatel'skiy institut trikotashnoy promyshlennosti.
(Knit goods) (Markocheva, P.I.) (Lebedkova, M.I.)

BORISHANSKAYA, T. M.

24101 BORISHANSKAYA, T. M. Potochnaya sistema proizvodstva na trikotazhno-bel'evoy fabrike. (Kotal'nyy i vyazal'nyy tsekhi, Tema No. 76). Sbornik rabot Nauch.-issled. IN-TA trikotazh. Prom-sti za 1946 G. M. - L., 1949, S. 21-56.

SO: Letopis, No. 32, 1949.

BORISHANSKAYA, T. M.

7684. BORISHANSKAYA, T. M. -- Organizatsiya truda pomoshchnikov mastera; obsluzhivayushchikh kruglochulochnyye mashiny KAS - 22. M., Gizlegprom, 1954. 184 s. s. ill. 23 sm.

SO: Knizhnaya Letopsis', Vol. 7, 1955

BORISHANSKAYA, T.M., kandidat tekhnicheskikh nauk.

Continuous flow methods in the small lot manufacture of knit
outer wear. Leg.prom. 16 no.4:17-19 Ap '56. (MLRA 9:8)
(Lvov--Knit goods industry) (Assembly-line methods)

BOEISHANSKIY, B.M.; KUTATELADZE, S.S.

Heat mission and hydraulic resistance in the flow of liquid metals
in circular tubes. Part 1. Zhur. tekhn. fiz. 28 no.4:836-847 Ap '58.
(Liquid metals) (Heat--Radiation and absorption) (MIRA 11:4)

L 35091-65 EWT(m)/EWP(w)/EWP(v)/T-2/EWP(k) Pf-4 EM
ACCESSION NR: AP5003581 S/0114/65/000/001/0007/0010

AUTHOR: Borishanskiy, K. N. (Engineer)

TITLE: Vibration of bars and blades tied by wire

SOURCE: Energomashinostroyeniye, no. 1, 1965, 7-10

TOPIC TAGS: steam turbine, blade vibration

ABSTRACT: As the first step in an evaluation of turbine-blade vibration, a set of straight bars with the lower ends constrained and the upper ends tied together by wire is considered with these assumptions: (a) the wire mass is negligible and (b) the wire does not have cantilever stiffness. A formula (7) for the frequency of bar vibration is derived. Next, an "intrabank" phase-shift vibration is considered, and the existence of only $m/2$ lower frequencies is proven, where m is the number of blades in the bank; these frequencies depend on the location of the wire tie. For the case of long twisted blades tied with closed damping wires,

Card 1/2

L 35091-65

ACCESSION NR: AP5003581

these findings are offered: (1) The disk vibration is actually an "intrabank" vibration; (2) In most cases, the tensility of the ties cannot be neglected; (3) The "intrabank" frequencies lie in a wide range and largely depend on the place and number of damping ties. Orig. art. has: 2 figures and 28 formulas.

ASSOCIATION: Leningradskiy metallicheskiy zavod (Leningrad Metal Plant)

SUBMITTED: 00

ENCL: 00

SUB CODE: PR

NO REF SOV: 005

OTHER: 000

mil
Card 2/2

DORISHANSKIY, L.S.

3(9)

PHASE I BOOK EXPLOITATION

SOV/2546

Moscow. Gosudarstvennyy okeanograficheskiy institut

Trudy, vyp. 42 (Transactions of the State Institute of Oceanography, Nr 42) Moscow, Gidrometeoizdat, 1958. Errata slip inserted. 850 copies printed.

Scientific Eds.: V.A. Tsikunova and P.S. Lineykin; Eds.: A.D. Perlovskaya and V.I. Tarkhunova; Tech. Ed.: I.M. Zarkh.

PURPOSE: This collection of articles is intended for scientific workers, graduate students, and engineers working in the field of marine physics.

COVERAGE: This issue of the Institute's Transactions contains articles on the further development of the statistical theory of wind wave disturbance, the problem of wind currents in a stratified sea, and a simplified method of computing vertical temperature distribution in the sea during a period of cooling. No personalities are mentioned. References accompany each article.

Card 1/2

Transactions (Gont.)

SOV/2546

TABLE OF CONTENTS:

Krylov, Yu.M. Statistical Theory and Computation of Wind Waves.
Part II

3

Kineykin, P.S. The Effect of an Interface on Wind Currents in
a Deep Sea

89

Brovikov, I.S. Deriving a Generalized Function of the Wave Height
Distribution on the Surface of a Heavy Liquid

105

Tsikunov, V.A. Simplified Theory of Convection Overturn in the
Upper Layers of the Sea

115

Borishanskiy, L.S. Distribution of Salinity in an Estuarine
Area of the Sea

128

AVAILABLE: Library of Congress

Card 2/2

MM/jb
11-30-59

BORISHANSKIY, L.S.

Method of calculating the distribution of salinity in waters off
the mouth of the river. Trudy Okean. kom. 10 no.1:119-126 '60.
(MIRA 14:6)

1. Gosudarstvennyy okeanograficheskiy institut Glavnogo
upravleniya gidrometeorologicheskoy sluzhby.
(Eustaries)
(Salinity),

BORISHANSKIY, L.S.

Calculation of spatial distribution of water salinity in shore
waters near river estuaries based on estuary studies of the
Volga River. Trudy GOIN no.49:38-46 '60. (MIRA 13:7)
(Volga Delta region--Salinity)

BORISHANSKIY, L.S.

Establishing the zone marked by the freshening influence of the river
near its mouth in the sea. Trudy GOIN no.47:38-47 '59.

(MIRA 12:11)

(Estuaries)

BORISHANSKIY, L.S.; KRYLOVA, Z.A.

Calculating the distribution of salinity in the Aral Sea. Trudy
GOIN no.77:27-38 '64. (MIRA 18:1)

BORISHANSKIY, L.S.

Calculation of the distribution of salinity of waters in the
pre-estuary area of the sea for a river with a wide mouth based
on the example of the mouth of the Neva. Trudy GOIN no.72:5-18
'64. (MIRA 18:1)

BORISHANSKIY, Lev Vladimirovich; ROTENBERG, Aron Zinov'yevich

[Capital construction in the lumber industry and the effectiveness of capital investments] Kapital'noe stroitel'stvo v lesnoi promyshlennosti i effektivnost' kapital'nykh vliizhenii. Moskva, Goslesbumizdat, 1960. 56 p.

(MIRA 13:11)

(Lumbering--Finance)

Calculating stress of bent rods and hoops in curved reinforced concrete sections by degree of deterioration. Moskva, Gos. izd-vo stroit. lit-ry, 1946. 78 p. (49-56768)

TA445.B6

GOL'DENBLAT, I., doktor tekhn.nauk; TAL', K., kand.tekhn.nauk;
BULGAKOV, V., kand.tekhn.nauk; BORISHANSKIY, M., kand.tekhn
nauk; VASIL'YEV, A., kand.tekhn.nauk; TURKIN, V., kand.tekhn.
nauk.; HEMIROVSKIY, Ya., kand.tekhn.nauk; MAKARICHEV, V.,
kand.tekhn.nauk.

Rude attempt to misappropriate achievements of the Soviet
art of building. Stroi.prom. 27 no.10:18-19 0 '49.
(MIRA 13:2)

(Reinforced concrete construction)
(Strains and stresses)

BORISHANSKIY, M.S., kandidat tekhnicheskikh nauk; GVOZDEV, A.A., professor,
~~doktor tekhnicheskikh nauk~~; MIZERNYUK, B.N., inzhener; NIKITIN, N.V.,
inzhener; SHERMAN, L.N., arkhitektor

Precast reinforced concrete beams developed by the State Planning
Institute of Industrial Construction and the Central Scientific
Research Institute of Industrial Construction. Rats. 1 izobr.
predl. v stroi. no.81:20-22 '54. (MIRA 8:6)
(Girders) (Precast concrete construction)

DORISHANSKIY, M. S.

USSR

BASHLAY, K. I. - "Dimensional tolerances of heavy elements" (Session IV)
 BELYA, Ye. I. - "Research on conditions of work and ultimate state of steel frames of industrial buildings" (Session II)
 BERG, O. Ya. - "Research on the concrete strength theory" (Session II)
 BOGDANOV (fnu) (probably Nikolay M. Bogdanov) and KHLUSOV (fnu) - "General regulations adopted in new 'Instructions on design, erection and maintenance of flat roofs in the USSR' and the result of recent investigation of flat roof structures in the USSR" (Session VI)
 DORISHANSKIY, M. S. - "Resistance of reinforced concrete members to the effect of transverse forces" (Session II)
 GULLEY, A. A., Prof. Dr. - "Present state and problems of design of building structures" (Session II)
 KLETSKOV, Grigoriy P., Prof. - "Eastern European experience" (Session IV)
 KORZOV, W. V., and KHEKOV, P. V. - "Problems of joining heavy elements in precast dwellings" (Session IV)
 MIRASHOV, V. I., Prof. Dr. - "Resistance to cracking and stiffness of reinforced concrete members" (Session II)
 OVSYANKIN, V. I., Prof., President of Session II; also scheduled to present a paper in Session IX, title not given. Member of the Steering Committee for the Congress.
 REZANITSIN, Aleksey A., Prof. Dr. - "Design of carrying capacity of slabs and shells by the limit balance method" (Session II)
 SHACH, P. P., GASTEV, O. A., Prof. Dr., and PETLIN, D. A. - "Stability of multi-story buildings of heavy elements" (Session IV)

reports to be submitted for the 2nd. Congress and Third General Assembly,
 2nd. Council for Building Research, Studies and Documentation, Rotterdam,
 Netherlands, 21-25 Sep 1979.

TAL', K.E., kand. tekhn. nauk; LESSIG, N.N., kand. tekhn. nauk; Prinsipali uchastiya: GVOZDEV, A.A.; ALEKSANDROVSKIY, S.V.; BORISHANSKIY, M.S.; DMITRIYEV, S.A.; KRILOV, S.M.; MIKHAYLOV, K.V.; MULIN, N.M.; NEMIROVSKIY, Ya.M.; CHISTYAKOV, Ye.A.; VASIL'YEV, B.F.; BOGATKIN, I.L.; ZALESOV, A.S.; NIKITIN, I.K.

New standards SNiP II-V. 1-62 for the design of concrete and reinforced concrete elements. Bet. i zhel.-bet. 9 no.3:97-102 Mr. '63. (MIRA 16:4)

1. Nauchno-issledovatel'skiy institut betona i zhelezobetona Akademii stroitel'stva i arkhitektury SSSR (for all except Vasil'yev, Bogatkin, Zalesov, Nikitin). 2. Gosudarstvennyy institut tipovogo proyektirovaniya i tekhnicheskikh issledovaniy (for Vasil'yev, Bogatkin, Zalesov, Nikitin).

1081. SOME DATA ON EVAPORATION OF A FLUID IN THE SPHEROIDAL STATE.
Borishanski, W. M. and Kutateladze, S. S. (Zh. tekhn. Fiz., Aug. 1947, 17, 891). The study of the spheroidal state is related to the mechanics of steam formation on high-temperature heating surfaces. The formation of spheroids begin when the temperatures of the surfaces is considerably higher than the boiling temperature; for water at atmospheric pressure this temperature lies in the region of 285° to 340°F. In order to investigate the conditions under which this spheroidal state of the fluid occurs, the authors have carried out a number of experiments using an electric furnace with an interchangeable cover, which served as a heating surface. The device was placed in a special glass container to facilitate observation and to allow photographs to be taken during the process of evaporation. No details are given of the method of carrying out these experiments, but the results are described in some detail and there are several diagrams, and photographs of various types of spheroids. The rate of evaporation of the fluid in

BORISHANSKIY, V.M.

✓ 3030. Borishanskiy, V. M. The problem of generalizing test data on the cessation of ebullition in a large volume of liquid (in Russian), Symp. Heat transmission and aerohydrodynamics, 169-181, Mashgiz, 1955; Ref. Zh. Mekh. 1956, Rev. no. 2949.

An examination is made of the boiling of water in a large volume. A distinction is made between the zone of medium heat loads for which the behavior of the vapor bubbles formed is characteristic, and the zone about the critical heat loads.

Analyzing the hydrodynamic model of the crisis of boiling starting from equations, proposed by S. S. Kutateladze, author examines the boundary layer of a boiling liquid at the approach to the crisis, as a system of jets (streams) of a liquid surrounded by vapor. The thickness of this layer is assumed equal to the separation diameter of the bubble. The crisis phenomenon is represented as a problem of disturbing the steady flow of a jet of liquid in a medium of gas moving coarsely with it; in this, axisymmetrical oscillations on a circular cylindrical jet are assumed, and the solution of the problem is limited to finding the connection between the increment N_c and the oscillation wave length λ_c . A similarity law for the critical heat load is found. The system of similarity criteria is not directly found from the initial equations and boundary conditions, but from the integral of this system.

As a result of constructing an arrangement of the phenomenon, combined criteria are obtained which the author considers characteristic for describing the critical conditions of boiling in a large volume for various liquids.

BORISHANSKI, V. M.

$$K = \frac{2.5}{\eta^{0.2} \cdot (18^2 \sigma^2 (y - y')^{0.2})} \quad N = \frac{y^{0.2}}{18^2 (y - y')^{0.2}}$$

The treatment of the tests enabled all the most reliable test data known in the appropriate literature to be reconciled within the limits of variation of the determining criterion N between 20,000 and 360,000, the formula $K = 0.13 + 4N^{-0.2}$ being recommended.
Courtesy Referativnyi Zhurnal P. I. Povarnin, USSR
 Translation, courtesy Ministry of Supply, England

Wz
amb

BEKISHANSKIY, V.H.

5979. HEAT EMISSION DURING BOILING AT HIGH, SUPERHIGH AND ABOVE
CRITICAL PRESSURE. BEKISHANSKIY, V.H. and MINCHENKO, S.S.
to Tskv, 1955; abstr. in Energomashinostroyeniye, 1957, 361. Experimental results are given for
water and alcohol in the range of pressures from 10 to 100 atm. Thermal conductivity is also
discussed.

BORISHANSKIY, V. M.

USSR/Processes and Equipment for Chemical Industries - Processes and Apparatus for
Chemical Technology, K-1

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 63931

Author: Borishanskiy, V. M.

Institution: None

Title: Criteria Formula for Generalization of Experimental Data on Cessation
of Bubble-Boiling Within a Large Volume of Liquid

Original

Periodical: Zh. tekhn. fiziki, 1956, 26, No 2, 452-456

Abstract: By consideration of the equations of hydrodynamics, boundary conditions and equations of material and heat balance at the phase partition boundary a system of criteria has been derived which characterize the phenomenon of bubble-boiling within a large volume of liquid:
 $K = q_{cr} \cdot \gamma^{-1} (\gamma'')^{-0.5} \cdot [g^2 \sigma (\gamma - \gamma'')]^{-0.25}$ and $N = \gamma \cdot \sigma^{1.5} \cdot g^{-1} \cdot \mu^{-2} \cdot (\gamma - \gamma'')^{-0.5}$.
As a result of a processing of the most reliable known literature data concerning bubble-boiling crisis a computation formula has been derived for the determination of the critical load $q_{cr} : K = 0.13 + 4N^{-0.4}$.

Card 1/2

USSR/Processes and Equipment for Chemical Industries - Processes and Apparatus for
Chemical Technology, K-1

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 63931

Abstract: The constant term of the binomial corresponds to the instance of highly turbulized liquid when the influence of viscosity can be disregarded, and K becomes automodel in relation to N . The second term represents correction for the viscosity of the liquid; with $N > 2 \cdot 10^6$ this correction is within the limits of 10% of the constant term. Also considered is the set of equations defining the boiling crisis taking into account all the details of the phenomenon, and a general system of similarity criteria has been evolved; however the analysis of this system as a whole cannot be effected due to insufficiency of available data. In the expressions cited τ , σ , γ and μ are latent heat of vaporization, surface tension, density and viscosity of the liquid, γ'' is density of vapor and $g = 9.81 \text{ m/sec}^2$.

Card 2/2

BURISHANSKIY, V. M. (Cand. Tech. Sci.

"Results of Experiments on Heat Transfer to Boiling Water at Super-high and Near Critical Pressures."

report presented at sci. and Tech. session on Heat Exchange during Change of Aggregate State of Matter 2 (by Comm. on High Steam Conditions, Power Inst. AS USSR, and Inst. Thermal Engineering, AS UkrSSR), Kiev, 23-28 Sep 57.

Cent. Boiler Turbine Inst.

BORISHANSKII, V.M.

AUTHOR: Kutateladze, S.S., Professor, Doctor of Technical Sciences,
and Borishanskii, V.M., Candidate of Technical Sciences. ²⁹⁸

TITLE: Influence of the speed of flow on the critical density of a
heat flow during boiling of water. (Vliyanie skorosti techeniya
na kriticheskie plotnosti teplovogo potoka pri kipenii vody)

PERIODICAL: "Energomashinostroenie" (Power Machinery Construction),
1957, No. 2, p. 10, (U.S.S.R.)

ABSTRACT: The published data on the influence of the speed of flow
on critical conditions during boiling of water relate only
to the first critical density of the heat flow at which bubble
boiling is substituted by film boiling; so far, data on the
magnitude at which a disruption of the steam film and estab-
lishment of the bubble boiling take place have not been pub-
lished. The authors used the test set-up as shown in Fig. 1.
This, and the methods of carrying out the experiments are
described and data are given in a graph.
2 figures. There are 9 references, 7 of which are Russian.

AUTHOR: . Borishanskiy, V.M., Candidate of Technical Sciences and
Kutateladze, S.S., Doctor of Technical Sciences. 114-6-2/11

TITLE: . On heat transfer and hydraulic resistance calculations
for the flow of liquid metals in pipes. (O raschete
teplootdachi i gidravlichesкого soprotivleniya pri
techenii zhidkikh metallov v trubakh.)

PERIODICAL: "Energomashinostroenie" (Power Generation Machinery
Construction) 1957, Vol.3, No.6, pp. 5-8 (U.S.S.R.)

ABSTRACT: Reference is made to earlier work on the flow of
mercury in pipes. This note describes experiments carried
out in 1950-1955 to study friction with iso-thermal and
non-iso-thermal flow of liquid metals in steel pipes. The
materials tested were molten bismuth and the eutectic alloy
of lead (43.5%) and bismuth (56.5%). The tests with bismuth
were made in steel piping 9.09 mm internal diameter at
temperatures of 360-470 °C and at Reynolds numbers (Re) up
to 180 000. The tests were made on a small circuit con-
sisting of a vertical pump the measured section and conn-
ecting pipes. The circuit was placed in a thermostat,
the results are shown in a graph of the frictional resist-
ance against Reynolds number.

Card 1/3 To study the resistance on the Pb-Bi eutectic a set-up

On heat transfer and hydraulic resistance calculations
for the flow of liquid metals in pipes. (Cont.)

114-6-2/11

was constructed so that the tests could be carried out with both iso-thermal and non-iso-thermal flow of medium. The equipment is illustrated by a sketch. The results are given in the form of a graph of the resistance against Re . Over the range of $Re = 5\ 000$ to $50\ 000$ data are available for water and over the range $40\ 000$ to $180\ 000$ experimental data were obtained for Pb-Bi eutectic for iso-thermal and non-iso-thermal flow.

From the results it may be concluded that the hydraulic resistance of liquid metals with thermal loadings up to 1 million kcal/m²hr may be calculated from the formulae for hydraulic head of ordinary liquids.

The article also presents briefly the results of heat transfer measurements with the Pb-Bi eutectic and sodium in round pipes. In these tests a study was made of the influence on heat transfer of the speed, the pipe diameter, the relative length of tube, the heat flow and the physical properties of the liquid ($Pr = 0.005-0.035$). To evaluate the influence of additives on the nature of the contact between the surface and metal and its influence on heat transfer, special tests were made with Pb-Bi eutectic to which was added metallic magnesium. The test conditions are tabulated.

Card 2/3

The results of the tests are given in the form of a graph

On heat transfer and hydraulic resistance calculations
for the flow of liquid metals in pipes. (Cont.) 114-6-2/11

of heat transfer against thermal loads and the results of all the tests on Pb-Bi eutectic for tubes with L/D greater than 30 in co-ordinates of $Nu = f(Pe)$ are given in a graph. In tests with sodium, special attention was paid to purifying the neutral gas and the actual metal. The results of tests over the range $Pe = 90-1800$ are given in the form of a graph. The graphs show that for values of Pe greater than 300 all the data are in satisfactory agreement. When Pe is less than 300 the experimental data for sodium are lower down to values of Nu less than 4.36, which corresponds to laminar flow. A line corresponding to the equation $Nu = 0.7Pe^{1/3}$ can be drawn through the experimental points. The results obtained are in good agreement with published work of other authors.

Card 3/3

There are 6 figures, 1 table and 6 literature references
(5 Slavic).

PHASE I BOOK EXPLOITATION

775

Kutateladze, S.S., Borishanskiy, V.M., Novikov, Ivan Ivanovich,
and Fedynskiy, O.S.

Zhidkometallicheskiye teplonositeli (Liquid Metal Heat-Transfer
Agents) Moscow, Atomizdat, 1958. 204 p. (Series: Atomnaya
energiya. Prilozheniye, 1958, no 2) 8,750 copies printed.

Resp. Ed.: Koryakin, Yu. I.; Tech. Ed.: Usachev, G.L.

PURPOSE: This book is intended for scientists and engineers
working in the field of reactor construction and nuclear
engineering. It can also be useful in other fields where
liquid metal heat-transfer agents are applicable.

COVERAGE: This booklet, a 1958 supplement to the periodical
"Atomic Energy," is devoted to a study of liquid metal heat-
transfer agents used in nuclear power engineering. The authors
present data from Soviet and foreign research in this field
conducted within the last 10 years. The greater part of the

Card 1/4

Liquid Metal Heat-Transfer Agents

775

text was written by S.S. Kutateladze, V.M. Borishanskiy, and I.I. Novikov. Chapters I, III, V, and VIII were written in collaboration with O.S. Fedynskiy. G.M. Lyamkin, N.A. Prikhodchenko and Yu. I. Koryakin took part in preparing the manuscript. There are 81 references of which 40 are Soviet, 32 English, 5 German, and 4 French .

TABLE OF CONTENTS:

From the Editor	5
Ch. 1. Basic Properties of Liquid Metals	7
Ch. 2. Fields of Application of Liquid Metal Heat-Transfer Agents	23
Ch. 3. Hydraulic Resistance During Flow of Liquid Metals	27
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Card 2/4	

KNORRE, G.F., red.; BORISHANSKIY, V.M., red.; ZABRODINA, A.A., tekhn.red.

[Problems of aerodynamics and heat transmission in boiler and furnace processes] Voprosy aerodinamiki i teploperedachi v kotel'no-topochnykh protsessakh; sbornik statei. Moskva, Gos. energ. izd-vo, 1958.
329 p. (MIRA 11:9)

(Furnaces)

(Boilers)

(Heat engineering)

BORISHANSKIY, V.M.

24(8)

PHASE I BOOK EXPLOITATION

SOV/1599

Kutateladze, Samson Semenovich and Veniamin Mironovich Borishanskiy

Spravochnik po teploperedache (Handbook on Heat Transfer) Leningrad, Gosenergoizdat, 1958. 414 p. 25,000 copies printed.

Ed.: S.I. Mochan; Tech. Eds.: A.A. Zabrodina and G.Ye. Larionov.

PURPOSE: This book is intended for engineers and thermodynamicists and may also be useful to students specializing in the various fields of thermodynamics.

COVERAGE: This handbook contains a brief outline of the basic concepts of the theory of heat transfer. The most important computational formulas are presented. A summary is given of the physical characteristics required for calculating heat transfer by conduction, convection, and radiation. Auxiliary data also are presented. The methods for calculation are based either on officially standardized data (of which, however, there exist only very few) or, mostly, on otherwise established and accepted data. In sections dealing with certain special fields such as gas dynamics, theory of drying, etc., where the problems of heat transfer cannot be considered without their

Card 1/25

Handbook on Heat Transfer

SOV/1599

connection with other problems, only the most basic concepts and results, and also the necessary bibliographies, are given. The references used in compiling this handbook are enumerated at the end of each chapter. Several coauthors participated in the compilation of particular sections: A.G. Blokh (Ch. 14, 15); L.M. Zysina-Molozhen (section 8, 6); R. Ye. Krzhizhanovskiy (Ch. 4); E.V. Firsova (Appendix); A.A. Andreyevskiy (Ch. 17); and S.I. Mochanov (section 16, 4). The authors express their gratitude for valuable comments to the reviewers: A.A. Armand, L.D. Berman, V. Ye. Doroshchuk, V.L. Iel'chuk, M.S. Pirogov, S.A. Ryvkin, and Ye. Ya. Sokolov. There are 259 references of which 206 are Soviet, 33 English, 18 German, and 2 French.

TABLE OF CONTENTS:

Preface	3
List of basic symbols	15
Some useful mathematical definitions and formulas	19
Card 2/25	

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., SOV/89S-58-2-1/13
Novikov, I. I., Fedynskiy, O. S.

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli)
* Chapter 1: Basic Properties of Liquid Metals (Glava 1. Osnovnyye
svoystva zhidkikh metallov)

PERIODICAL: ** Atomnaya energiya, 1958, * Supplement 2, pp. 7-22 (USSR) **

ABSTRACT: The physical properties are given in form of tables for the liquid
state of the following elements:

- 1.) Mercury
- 2.) Sodium
- 3.) Kalium
- 4.) Lithium
- 5.) Bismuth
- 6.) Gallium
- 7.) Lead.

The theory of the thermodynamical similitude of real bodies is
explained and applied to the investigation of the properties of
liquid metals. This chapter further deals with the following sub-
jects: Experimental data concerning the velocity of propagation

Card 1/2

* Chapters 1-13

** Atom. Energ. 58 Sup. 2, pp 7-202

Liquid Metal Heat Carriers.

SOV/89S-58-2-1/13

Chapter 1: Basic Properties of Liquid Metals

of sound in liquid metals, and a method of estimating this quantity by calculation.

This and the following chapters take data published within the past 10 years into account both in the USSR and in other countries.

The entire compilation was signed by S. S. Kutateladze,

V. M. Borishanskiy and I. I. Novikov, as the responsible authors.

C. S. Fedynskiy participated in compiling chapters 1, 3, 5 and 8.

G. M. Lyamkin, N. A. Prihodchenko and Yu. J. Koryakin assisted in writing the manuscript. There are 3 figures, 12 tables.

1. Liquid metals--Properties 2. Liquid metals--Sound transmission

Card 2/2

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., SOV/89S-58-2-2/13
Novikov, I. I., Fedynskiy, O. S.

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli)
Chapter 2: Ranges of Application of Liquid Metal Heat Carriers
(Glava 2, Oblasti primeneniya zhidkometallicheskikh teplonositeley)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 23-26 (USSR)

ABSTRACT: The following subdivision offers a survey of the various ranges
of application:
a) General considerations.
b) Use of liquid metal heat carriers in steam-producing plants.
c) The use of liquid metal heat carriers in nuclear power plants.
There are 1 figure.

1. Liquid metals--Applications 2. Liquid metals--Heat transfer

Card 1/1

AUTHORS: Kutateladze, S. S., ~~Borishanskiy, V. M.~~, SOV/89S-58-2-3/13
Novikov, I. I., Fedynskiy, O. S.

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli)
Chapter 3: The Hydraulic Resistance of Flowing Liquid Metals
(Glava 3. Gidravlicheskiye soprotivleniye pri tekhnii zhidkikh
metallov)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 27-37 (USSR)

ABSTRACT: The following subdivisions offer a survey of the matter dealt with:

- 1.) Flow in smooth tubes.
Investigations showed that the laws of resistance for flowing liquid metals in smooth tubes are practically the same as in the case of non-metal liquids.
- 2.) Flow in rough tubes.
The hydraulic resistance of steel tubes to H₂O, Hg and Sn is graphically represented.
- 3.) Influence exercised by the heat carrier.
- 4.) Local resistance.
- 5.) Friction of a revolving disk.
The consumption of energy necessary for the rotation of a

Card 1/2

Liquid Metal Heat Carriers.
Chapter 3: The Hydraulic Resistance of
Flowing Liquid Metals

SOV/898-58-2-3/13

smooth disk of 270 mm ϕ and 10 mm thickness in Hg, oil, H₂O
and petroleum is shown by a graph.

6.) Increase of pressure in the case of a hydraulic impact.
There are 10 figures.

1. Liquid metals--Hydrodynamic characteristics
2. Fluid flow--Resistance
3. Friction

Card 2/2

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., SOV/89S-58-2-5/13
Novikov, I. I., Fedynskiy, O. S.

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli)
Chapter 5: Heat Transfer in Flows Through Tubes (Glava 5.
Teplootdacha pri techenii v trubkakh)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 47-95 (USSR)

ABSTRACT: The following subdivision allows a survey of this matter:
a) Theoretical solutions.
b) Experimental data concerning the heat transfer to mercury.
c) Experimental data concerning the heat transfer to the eutectic
lead-bismuth.
d) Experimental data concerning the heat transfer to tin.
e) Experimental data concerning the heat transfer to the eutectic
sodium-kalium.
f) Comparison of the empirical values obtained concerning the
average heat transfer in tubes with $L/D > 30$ for:
1.) mercury
2.) sodium
3.) eutectic: sodium-kalium
4.) influence exercised by additions.

Card 1/2

Liquid Metal Heat Carriers.

Chapter 5: Heat Transfer in Flows Through Tubes

SOV/89S-58-2-5/13

g) Comparison of empirical values obtained concerning the heat transfer in slit.

There are 67 figures, 1 table.

1. Liquid metals--Heat transfer

Card 2/2

AUTHORS: Kutateladze, S. S., ^{SOV/89S-58-5-4/4} Borishanskiy, V. M., Novikov, I. I.,
Fedynskiy, O. S.

TITLE: Supplementary Table: "Liquid Metallic ~~Heat~~ Carriers" (Prilozheniya:
Zhidkometallicheskiye teplonositeli)

PERIODICAL: Atomnaya energiya, 1958, Supplement 5, Inserted Between
pp 108 and 109 (USSR)

ABSTRACT: This is a supplement to table 12.1 (pp 172-173) and the
explanation of the positions 1 - 33 on the drawing 12.1
(pp 177) in connection with the paper published in Atomnaya
energiya, 1958, Supplement Nr 2. The table contains data on
physical properties of metallic heat carriers. There is 1 table.

Card 1/1

89-4-5-3/26

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I.

TITLE: Heat Transfer to Liquid Metals (Teploobmen v zhidkikh metallakh)

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 5,
pp. 422 - 436 (USSR)

ABSTRACT: From foreign and Soviet references a survey of data is given that have as yet been obtained on the heat exchange between solid surfaces and a flow of molten metal. Particularly the experimental data of the heat transfer to liquid metals are given if these metals flow in long or short tubes in plane slits. The available data for the following cases are also given: The tubes or plates are longitudinally coated by liquified metal; cylinders are flowed around transversely; there is free convection; a condensation of the vapor of the liquid metal occurs. As heat carriers, mercury, an eutectic alloy of lead and bismuth, sodium and sodium-potassium are used. The influence of admixtures to these heat carriers on their heat

Card 1/2

Heat Transfer to Liquid Metals

89-4-5-3/26

transferring capacity is investigated. The respective formulae are derived for the heat transfer in various cases. There are 11 figures, 2 tables and 30 references, 14 of which are Soviet.

SUBMITTED: November 4, 1957

AVAILABLE: Library of Congress

1. Liquid metals—Heat transfer

Card 2/2

BORISHANSKIY, V.M., kand. tekhn.nauk; MIGAY, V.K., inzh.

In the section of heat transfer and combustion of the Technical
Turbine Manufacturing Council in Leningrad. Energomashinostroenie 4
no. 6:46-48 Je '58. (MIRA 11:8)

(Turbines)
(Heat--Transmission)

BORISHANSKIY, V.M., kand.tekhn.nauk

Coefficients of heat transfer in boiling water at superhigh pressures. Energomashinostroenie 4 no.7:5-9 J1 '58.

(MIRA 11:10)

(Heat--Transmission) (High pressure research)

57-28 4-27/39

AUTHORS: Borishanskiy, V. M., Kutateladze, S. S.

TITLE: Heat Emission and Hydraulic Resistance in the Flow of Liquid Metals in Circular Tubes (Teplootdacha i gidravlicheskiye soprotivleniya pri techenii zhidkikh metallov v kruglykh trubakh)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 4, pp. 836-847 (USSR)

ABSTRACT: The authors performed an experimental investigation of the heat emission and of the hydraulic resistance in the flow of various liquid metals in tubes (bismuth, lead-bismuth, eutectic, sodium). The experiments were made in an isothermal ($\Delta t \rightarrow 0$) and a nonisothermal flow, where the heat currents changed up to $1300000 \text{ kcal/m}^2 \cdot \text{hour}$. The domain of the Pe-coefficient covered by the experiments was $100 : 11000$, that of the Pr-coefficient $0.005 : 0.035$, that of the diameters of the tubes from 5 to 35 mm and that of the relative lengths L/D from 15 to 100 at Re-coefficients > 10000 . Formulae were obtained here with the aid of which the heat emission to the liquid metals turbulently flowing.

Card 1/2

57 28 4 27/39

Heat-Emission and Hydraulic Resistance in the Flow of Liquid Metals in Circular Tubes

in circular tubes can be calculated: $Nu = 4.3 + 0.002 Pe$ (when $L/D > 30$, $Pe > 300$, $Re > 10000$); $Nu = 0.7 Pe^{1/3}$ (when $50 < Pe < 300$, $L/D > 30$, $Re > 10^4$). It is shown that a modification of the viscosity can not exert any essential influence upon the drag. At the same time, however, the density of the investigated metals slightly depends on temperature. L. L. Shneyderman and N. I. Ivashchenko participated in the experiments. There are 9 figures, 1 table, and 8 references, 3 of which are Soviet.

SUBMITTED: November 23, 1956

Card 2/2

BORISHANSKIY, V. M.: Doc Tech Sci (diss) -- "Thermal emission in a boiling liquid with free convection". Moscow, 1959. 35 pp (Min Higher Educ USSR, Moscow Engineering-Phys Inst), 120 copies (KL, No 17, 1959, 108)

BORIS HANSKIY, U.M.

21 (A)	PHASE I BOOK EXPLOITATION	SOV/2983
	International Conference on the Peaceful Uses of Atomic Energy, 2nd, Geneva, 1958.	
	Doklady sovetskikh uchenykh; yadernyye reaktory i yadernaya energiya. (Reports of Soviet Scientists; Nuclear Reactors and Nuclear Energy). Moscow, Atomizdat, 1958. 707 pages. (Series: It's Trudy, vol. 2) Errata slip inserted. 8,000 copies printed.	
	General Eds.: M.A. Dolgin, Corresponding Member, USSR Academy of Sciences, K. E. Zhukovskiy, Doctor of Physical and Mathematical Sciences, A.I. Leipunskiy, Member, Ukrainian SSR Academy of Sciences, I.I. Bukharin, Corresponding Member, USSR Academy of Sciences, and V.S. Purayev, Doctor of Physical and Mathematical Sciences; Ed.: A.P. Alyab'yev; Tech. Ed.: Ye. I. Muzal.	
	PURPOSE: This book is intended for scientists and engineers engaged in reactor designing, as well as for professors and students of higher technical schools where reactor design is taught.	
	CONTENTS: This five-volume set contains a six-volume collection on the peaceful uses of atomic energy. The six volumes contain the reports pre- sented by Soviet scientists at the Second International Conference on Peaceful Uses of Atomic Energy, held from September 1 to 13, 1958 in Geneva. Volume 2 consists of three parts. The first is devoted to atomic power plants under construction in the Soviet Union; the second to experimental and research reactors, the ex- periments carried out on them, and the work to improve them; and the third, which is predominantly theoretical, to problems of nuclear reactor physics and construction engineering. Yu. I. Boryskin is the science editor of this collection. See SOV/2081 for titles of all volumes of the set. References appear at the end of the articles.	
	Dolizhail', M. A., A. E. Krasin, E. A. Mikhaylov, M. M. Orlovskiy, and V. M. Ushakov. Experiments of Operating the First Atomic Power Plant in the USSR and the Plant's Work Under Boiling Conditions (Report No. 2183)	15
	Dolizhail', M. A., A. E. Krasin, P. I. Alekshchukov, A. K. Grigor'yants, B. I. Korotkiy, M. G. Kravchenko, V. V. Yemel'yanov, M. M. Puzhikov, I. A. Rukhovich, M. K. Mityayev, and M. G. Golovin. A Graphical Description of the Operation of the First Atomic Power Plant (Report No. 2184)	36
	Aleksandrov, A. P., I. I. Artyukov, A. I. Brander, A. A. Brander, G. I. Glukhov, B. Ya. Gerasimov, V. I. Gerasimov, and M. E. Kholopkin. The Atomic Reactor "Lenin" (Report No. 2185)	60
	Glukhov, G. I., V. V. and B. G. Pricupits. Radiation Safety System of the Atomic Icebreaker (Report No. 2186)	87
	Glukhov, G. I. Water-water Power Reactors (VVER) in the USSR (25 Reports No. 2187)	95
	Aleksandrov, A. P., A. K. Glukhov, V. V. Gerasimov, A. I. Kovalov, and M. A. Muraviov. Heat-producing Elements for Water-water Reactors of Atomic Power Plants (Report No. 2194)	119
	Krushilin, G. M. and V. I. Subbotin. Cooling Water-water Reactors (Report No. 2194)	134
	Yermakov, V. S. and I. V. Ivanov. A Study of Unsteady Heat Trans- fer in Heat-producing Elements of Nuclear Reactors (Report No. 2195)	153
	Ivanovskiy, M. M., V. I. Subbotin, and E. A. Mikhaylov. High-speed Method of Measuring the Heat Transfer Coefficient in the Pipe (Report No. 2195)	166
	Butevaladze, A. S., V. I. Subbotin, I. M. Borichenko, and P. I. Krivonozhko. Heat Exchange During the Flow of Liquid Metal in the Pipes (Report No. 2210)	176
	Kashchinskii, O. D. Economics of Nuclear Fuel in Fast Power Re- actors (Report No. 2028)	188
	Shkiba, V. M., E. A. Kraschitskiy, Yu. I. Sidorov, and O. V. Sidorov. Thermal Neutron Density Distribution Along the Radius of Assemblies of Rod-shaped Heat Producing Elements (Report No. 2034)	199

ZHUKOVSKIY, Valentin Semenovich; BORISHANSKIY, V.M., red.; SOBOLEVA,
Ye.M., tekhn.red.

[Principles of the theory of heat transfer] Osnovy teorii
teploperedachi. Moskva, Gos.energ.izd-vo, 1960. 211 p.
(MIRA 13:12)

(Heat--Transmission)

S/081/61/000/019/040/085
B110/B101

24.5200

AUTHOR: Borishanskiy, V. M.

TITLE: Heat transfer during boiling

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1961, 239, abstract
19I40 (Sb. "Dostizh. i zadachi v proiz-ve i primeneni
kholoda v narodn. kh-ve SSSR". M., 1960, 39 - 46)

TEXT: The present article deals with experimental investigations of heat transfer and presents a theoretical generalization of the experimental results during film and bubble boiling. The experimental studies of heat transfer during film boiling were carried out using ethyl alcohol, isooctane, octane, benzene, and ethyl ether on heatable graphite- and steel surfaces at a rate of heat load $q = (250 - 900) \cdot 10^5 \text{ kcal/m}^2\text{hr}$. Two zones were found to exist in the course of the heat-transfer coefficient α as a function of q : the transition zone and that of fixed film boiling. In the transition zone α decreases with increasing q . In the zone of fixed film boiling the heat transfer increases with increasing q . Here the pressure effect on α is identical at all values of q . The self- ✓B

Card 1/2

Heat transfer during boiling

S/081/61/000/019/040/085
B110/B101

simulating nature of the kinematics of the vapor bubble motion relative to the linear dimension of the heated surface was determined by following the process photographically by means of high-speed motion pictures. A generalization of the experimental results based on the extended concept of the thermodynamic similarity of substances on the saturation line curve was given for the heat transfer during developed bubble boiling. Treatment of experimental data was done in a generalized thermodynamic coordinate system. It was shown that the experimental data lie along a curve with a maximum deviation of $\pm 30\%$. The generalized dependence formulated by the author allows calculation of the heat transfer on the basis of a single experimental α value together with the critical pressure of the substance in question. The author points out the complex character of the pressure effect on the intensity of heat transfer and the impossibility of its representation by a power function with a constant exponent. [Abstracter's note: Complete translation.] ✓B

Card 2/2

S/114/60/000/011/011/011
E194/E484

AUTHOR: Borishanskiy, V.M., Candidate of Technical Sciences

TITLE: A Session on Convective Heat Transfer

PERIODICAL: Energomashinostroyeniye, 1960, No.11, pp.47-48

TEXT: From June 15 - 20, 1959 a Scientific Technical Session on Convective Heat Transfer was held in Leningrad. It was convened by the Commission on Thermal Power Engineering of the AS USSR, the Committee on Heat Exchange and Combustion of the Turbine Sub-Section of the Leningrad Council of National Economy, the Central Boiler Turbine Institute and the Power Engineering Institute AS USSR. The session was opened by a short speech from Candidate of Technical Sciences [N.V.Ilyukhin], now deceased. Sections of the session considered heat exchange in single and two-phase flows and the cooling of parts of steam and gas turbines and auxiliary equipment. Seventeen communications and reports were read. In the Plenary Session a report was read by staff of the Power Engineering Institute AS USSR, M.A.Styrikovich, Z.L.Miropol'skiy, I.L.Mostinskiy, A.A.Stavrovskiy and others on "Critical boiling conditions during forced flow of water and steam-water mixtures". A communication was read by V.Ye.Doroshchuk and Card 1/7

S/114/60/000/011/011/011
E194/E484

A Session on Convective Heat Transfer

F.P.Frid of the All-Union Heat Engineering Institute on "An experimental investigation of the influence of various mechanical factors on the critical rate of heat transfer". I.I.Novikov described conditions of complete similarity of heat transfer processes in various liquids. G.N.Abramovich gave a report on the application of the main laws of turbulent flow to the general case of flow with variable density and in particular diffusive flow.

A.A.Gukhman of the Moscow Division of the Central Boiler Turbine Institute gave new data on the properties of transonic flow.

V.V.Dedyakin and V.L.Lel'chuk described investigations on local heat transfer and hydraulic resistance during the turbulent flow of gas in pipes at high temperature heads. S.I.Kosterin and Yu.A.Koshmarov of the Power Engineering Institute AS gave a formula for calculating the governing temperature in calculations of convective heat transfer and friction for gases with Prandtl number ≈ 1 . L.D.Berman and S.I.Fuks of the All-Union Heat

Engineering Institute described the main results of the Institute in calculating the surface cooling of condensers. V.A.Rachko of the Central Boiler Turbine Institute read a report entitled "Heat Card 2/7

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exchange and mass exchange on tube bundles during movement of a steam-air mixture in a vacuum". L.M.Zysina-Molozhen of the Central Boiler Turbine Institute described a method of calculating the mean intensity of heat transfer in profiles in a flow of compressible gas. S.S.Kutateladze and E.P.Karpeyev of the Central Boiler Turbine Institute described an experimental investigation of condensation of high-pressure water-vapour inside a horizontal tube. S.L.Miropol'skiy of the Power Engineering Institute AS described the results of an investigation of heat transfer during cooling of water and condensation of steam-water mixture at high pressure inside a vertical copper tube. B.P.Mironov briefly described work on heat transfer carried out in the Neva Engineering Works. A brief account is given of contributions to discussion of these reports. The following reports were read at the section on Convective Heat Exchange in Uniform Media. B.S.Petukhov, V.V.Kirillov and A.S.Sukomel of the Moscow Power Engineering Institute gave a report entitled "Investigations on heat exchange and restoration of wall temperature during turbulent flow of gas in tubes at Mach values up to 4". V.P.Motulevich of the Power

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Engineering Institute AS described a method of calculating heat transfer near the ends of flat and axially symmetrical bodies in a supersonic gas flow. M.E.Shitsman of the Power Engineering Institute AS gave a report entitled "Investigations of heat transfer when cooling water and steam near the critical region". Krasnoshchekov of the Moscow Power Engineering Institute described investigations of heat transfer during the motion of carbon dioxide in a tube at pressures near the critical value. L.A.Vulis and V.P.Kashkarov of the Power Engineering Institute AS KazSSR gave a report entitled "The thermal problem for jet flows of Gas and liquid". S.I.Kosterin, A.I.Lent'yev and I.A.Kozhinov of the Power Engineering Institute AS described an approximate semi-empirical method of calculating the turbulent boundary layer. I.G.Kulakov of the Power Engineering Institute AS gave a communication entitled "The application of the heat of electronic bombardment to investigate heat exchange". B.S.Petukhov of the Moscow Power Engineering Institute gave a report entitled "Investigation of heat exchange during the flow of liquid in tubes at small values of Renolds number". Kh.A.Barlybayev and

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S.V.Bukhman of the Power Engineering Institute ASKazSSR gave a report entitled "Experimental investigation of convective heat exchange at high thermal fluxes". M.S.Pirogov and V.L.Lel'chuk described tests on heat transfer in a flow of metallic sodium in a round tube. Ye.M.Khabakhpasheva, Yu.M.Il'in and D.A.Chirov described tests on heat transfer to a eutectic alloy of potassium-sodium. L.A.Vulis and V.P.Ustimenko of the University and Power Engineering Institute AS KazSSR gave a report entitled "Calculations of convective heat exchange at low values of Prandtl number". V.I.Petrovichev gave a report on heat transfer to mercury with variable thermal loading along the length of the duct. L.G.Loytsyanskiy of the Leningrad Polytechnical Institute gave a brief theoretical note on heat transfer and diffusion. P.A.Kirillov gave a communication entitled "The influence of oxides on the heat transfer of sodium-potassium alloy and removal of oxides from the alloy." V.I.Petrovichev described results of work on heat transfer during the flow of mercury in annular gaps, which agrees with the results given by Ye.M.Khabakhpasheva. Ye.V.Kudryavtsev and N.V.Shumakov of the Power Engineering

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Institute AS gave a report entitled "The relationship between transient heat exchange and the dimensions and physical parameters of solid bodies. I.Ye.Virozub of the Power Engineering Institute AS UkrSSR described an approximate solution of the equation of laminar boundary flow with the flow gradient and heat exchange. Yu.P.Shlykov and A.I.Yevstaf'yev described tests on heat exchange to water in flat annular ducts at high thermal loading. I.T.Shvets, Ye.P.Dyban, G.F.Selyavin and M.V.Stradomskiy of the Power Engineering Institute AS UkrSSR gave a report entitled "The influence of initial turbulence of flow on heat transfer and hydraulic resistance during the motion of water in pipes". Yakovlev gave a communication entitled "Local and mean heat exchange during turbulent flow of water in pipes". P.A.Ushakov described investigations on heat transfer and hydraulic resistance during longitudinal flow of mercury and water over tube bundles. I.P.Sviridenko described the results of tests on the hydraulic resistance and heat transfer during the flow of mercury in narrow angular ducts. A.A.Sholokhov described the procedure for making corrections to the temperature head with various methods of using thermocouples. N.I.Buleyev
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described the theoretical method of selecting the governing linear dimensions for heat exchange during longitudinal flow of liquid in ducts of complicated profile.
Conclusion in Energomashinostroyeniye, 1960, No.12.



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AUTHOR: Borishanskiy, V.M., Candidate of Technical Sciences
TITLE: A Session on Convective Heat Transfer
(Continued from Energomashinostroyeniye, 1960, No.11)
PERIODICAL: Energomashinostroyeniye, 1960, No.12, pp.43-45
TEXT: The following reports were read in the section on convective heat exchange in two-phase media: V.M.Borishanskiy gave a report entitled "Heat transfer relationships during film-wise boiling". A.P.Ornatskiy (of KPI) gave a report entitled "An investigation of the influence of tube length and diameter on the critical thermal flux density", which described tests carried out with water in tubes at pressures up to 25 kg/cm². A.P.Ornatskiy and M.A.Kichigin read a report entitled "An investigation of critical heat exchange with small values of under-heating". V.N.Filatkin (of LIKhP) gave a report entitled "Heat exchange during the boiling of water-ammonia solutions". V.I.Nevstruyeva gave a report entitled "An investigation of steam content distribution by the β -irradiation method during the surface boiling of water not heated up to the saturation temperature". Contributors to the discussion included

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Energomashinostroyeniye, 1960, No.11)

V.Ye.Doroshchuk, A.P.Ornatskiy, G.G.Treshchev and M.A.Styrikovich.
V.I.Tolubinskiy (of KPI) gave a report on the "Rate of growth of
steam bubbles during boiling". G.G.Treshchev of the All-Union
Heat Engineering Institute gave a report entitled "High-speed
cinematography of surface boiling of water at pressures up to
50 atmospheres". V.G.Morozov gave a report entitled "New
experimental data on critical thermal loading and heat exchange
during boiling". I.S.Sagan' (of KTI PP) gave a report entitled
"An investigation of heat exchange during the boiling of highly
concentrated sugar rheostats. N.V.Tarasova of the All-Union
Heat Engineering Institute gave a report entitled "An investigation
of hydraulic resistance during the surface boiling of water in pipes"
A.P.Ornatskiy and A.M.Kichigin (of KPI) gave a report entitled
"An investigation of the hydraulic resistance of small diameter
tubes with high thermal fluxes". N.I.Semenov and S.I.Kosterin of
the Power Engineering Institute AS USSR gave a report entitled
"Relative speeds and hydraulic resistances to flow of a two-phase

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A Session on Convective Heat Transfer (Continued from
Energomashinostroyeniye, 1960, No.11)

mixture in a vertical tube". S.I.Mochan of the Central Boiler Turbine Institute gave a report entitled "Local resistances in a flow of two-phase mixture". K.P.Shumskiy (NIIkhimmash) gave a report entitled "The mechanism of heat exchange during condensation to the solid state. N.A.Buchko (LIKhP) read a report entitled "An investigation of convective heat exchange during the freezing of water". S.S.Kutateladze and B.A.Burakov gave a report entitled "Heat exchange during the boiling of dowtherm". N.V.Zozulya and V.I.Tolubinskiy (ITE AS UkrSSR) gave a report entitled "An investigation of heat exchange during the condensation of dowtherm vapours". I.P.Vishnev and N.K.Yelukhin gave a report entitled "Heat emission during the boiling of compressed gases in tubes". B.F.Glikman read a communication entitled "Special features of the process in jet condensers". S.A.Gorodinskaya (KPI) read a communication on "The condensation of binary mixtures". Ye.I.Sukharev of the Central Boiler Turbine Institute read a communication on "The influence of the structure

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A Session on Convective Heat Transfer (Continued from
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of steam-water mixture on the hydraulic characteristics of resistances". D.F.Peterson of the Central Boiler Turbine Institute gave a note on "The influence of foam in changing the resistance of circulation tubes". B.A.Pereverzev of the Central Boiler Turbine Institute described investigations of heat emission during cooling of a steam-water mixture. The following reports were read in the section on "Heat Transfer in Components of Steam and Gas Turbines and Auxiliary Equipment". I.T.Shvets and Ye.P.Dyban (ITE AS UkrSSR) gave a report entitled "Some results of investigations of air cooling of gas turbine rotors". Ye.I.Molchanov and Ye.R.Plotkin of the All-Union Heat Engineering Institute gave a report entitled "Temperature distributions in parts of gas and steam turbines". Ye.I.Sheyenin of the Central Boiler Turbine Institute gave a report entitled "Experimental determination of heat transfer coefficients in the end sections of gas turbine rotors whilst rotating". B.V.Podsevalov of the Central Boiler Turbine Institute gave a report entitled "An
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Energomashinostroyeniye, 1960, No.11)

experimental investigation of cooling a gas turbine rotor by blowing air through gaps in the tail joints of the blades". O.A.Kremnev and A.L.Satanovskiy (ITE AS UkrSSR) gave a report entitled "An investigation of the process of air-evaporative cooling of turbine machines and other equipment". The following took part in discussions: V.G.Tyryshkin of the Central Boiler Turbine Institute, Ye.P.Dyban, B.P.Mironov, V.S.Zhukovskiy. V.K.Migay of the Central Boiler Turbine Institute read a report entitled "Heat transfer during laminar flow of gas in ducts of small hydraulic diameter". V.S.Miller (ITE AS UkrSSR) gave a report entitled "On the question of contact heat transfer in parts of gas and steam turbines". Ye.A.Ganin and Yu.P.Shlykov gave a report entitled "An investigation of contact heat transfer". N.P.Klitin and V.A.Lokshin of the All-Union Heat Engineering Institute gave a report entitled "An investigation of heat transfer in plate ribbed heating surfaces". S.N.Tulin of the All-Union Thermo-Technical Institute gave a report entitled "An investigation

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Energomashinostroyeniye, 1960, No.11)

of heat transfer in tube bundles with wire ribbing".
V.G.Fastovskiy and Yu.V.Petrovskiy of the All-Union Electro-
Technical Institute gave a report entitled "An investigation of heat
transfer with resistance of tube bundles in square arrangement with
continuous spiral ribbing". O.A.Kremnev and N.V.Zozulya
(ITE AS UkrSSR) gave a report entitled "An investigation of
convective heat transfer to flat and cylindrical surfaces of small
geometrical dimensions and to ribbed surfaces of regenerators and
oil coolers". S.N.Faynzil'ber and A.I.Butuzov (KPI) gave a report
entitled "An investigation of liquid and evaporative cooling of the
windings of large turbo-alternators on models". V.I.Tolubinskiy
and V.M.Legkiy (KPI) gave a report entitled "Heat transfer and
resistance of contact bundles of finned tubes and bundles of round
tubes". B.V.Latenko of KPI gave a report entitled "Heat transfer
and aerodynamic resistance of regenerative air heaters of the grid
type". V.M.Antuf'yev of the Neva Works, Leningrad and LTI, gave
a report entitled "The intensification of heat exchange on the basis
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A Session on Convective Heat Transfer (Continued from
Energomashinostroyeniye, 1960, No.11)

of the roughness effect with longitudinal and transverse flow".
V.A.Zysin of LPI gave a report entitled "Some problems of heat
transfer in power installations on steam-gas mixtures".
S.I.Mochan and O.G.Revzina of the Central Boiler Turbine Institute
gave a report entitled "A generalization of experimental data on
the aerodynamic resistance of smooth-tube bundles with cross-flow".
V.G.Chakrygin gave a report entitled "An investigation of a new
type of small sized water economizer". The following took part
in the discussion: L.G.Gel'fenbeyn (KhPI), N.I.Filippov of the
Elektrosila Works, V.M.Antuf'yev, S.N.Tulin and L.I.Vol'per (of
the Kirov Works). The session decided that it was necessary to
improve coordination of scientific work on heat transfer.
Indications should be provided on the design of condensers for
steam turbines. The development of prototypes of new equipment
should be accelerated. Insufficient attention is being devoted to
theoretical methods of calculation and physical analysis of
experimental results. ✓

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BORISHANSKIY, V. M.

"Critical Loads at Boiling and Thermodynamic
Similarity."

Report submitted for the Conference on Heat and Mass Transfer,
Minsk, BSSR, June 1961.

USSR

PONOMAREV, V. R., CONVEYANCE, I. I. and
Kuznetsov, V. R., all with the Central
Research Institute of the Ministry of
Defense, Leningrad - "Use of thermodynamic
similarity in generalizing experimental data on
heat transfer" (Section IV, B)
DUBINSKY, Vasilii Ye., All-Union Scientific
Research Thermodynamic Institute Leonid P. E.
Dushinsky - "Critical boiling in tubes"
(Section III, A)
FEDOROV, B. S., KRAMAROV, Ye. A.,
and KRAMAROV, Ye. S., all with the Moscow Power
Engineering Institute, Ministry of Higher Education
USSR - "An investigation of heat transfer to fluids
flowing in pipes under supercritical conditions"
(Section V)
ZAKHARCHUK, S. S., Institute of Power Engineering,
Academy of Sciences, Siberian SSR, Minus
(1979 position) - "Heat transfer by fluidized bed"
(Section VI)

Report submitted but not presented at the International Conference on Heat Transfer
Foulmer, Colorado, 22 Aug - 1 Sep 1981.

ALESHIN, Vasily Sergeyevich; SARKISOV, Ashot Arakelovich;
AL'KIMOVICH, A.V., inzh., retsenzents; GREMILOV, D.I.,
kand. tekhn.nauk, retsenzents; DIDEYKIN, T.S., retsen-
zent; BORISHANSKIY, V.M., doktor tekhn. nauk, nauchnyy
red.; SMIRNOV, Yu.I., red.; KRYAKOVA, D.M., tekhn. red.

[Nuclear power reactors] Energeticheskie yadernye reaktory.
Leningrad, Gos. soiuзное izd-vo sudostroitel. promyshl.,
1961. 370 p. (MIRA 15:2)
(Nuclear reactors)

S/124/62/000/006/018/023
D234/D308

26.5400

AUTHORS: Borishanskiy, V. M., Bobrovich, G. I. and Minchenko,
F. P.

TITLE: Heat transfer during bubble boiling of water and
ethyl alcohol on the outside surface of pipes (in
large volumes)

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 6, 1962, 90-91,
abstract 6B587 (V. sb. Voprosy teplootdachi i gidrav-
liki dvukhfazn. sred, M.-L. Gosenergoizdat, 1961,
75-93)

TEXT: Experimental data are given on heat transfer during boiling
in a wide interval of variation of heat flow (water up to 10^6
kcal/hr.m², ethyl alcohol up to 7×10^5 kcal/hr.m²) and pressure
(from atmospheric to critical). The influence of boiling on heat
transfer is found and it is established that this influence is ex-
pressed by a complicated relation and cannot be represented in the
form of a simple power function with a constant exponent. Data

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Heat transfer during ...

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processing has been carried out according to criterial formulas of various authors, and showed that these formulas are only reliable in the domain for which they have been obtained. 17 references.
[-Abstracter's note: Complete translation.]

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S/693/61/000/000/004/007

D203/D302

26 5400

AUTHOR: Borishanskiy, V.

TITLE: Experimental investigation of heat transfer in film boiling on horizontal and vertical tubes in a large volume of liquid

SOURCE: Kutateladze, S.S. ed., Voprosy teplootdachi i gidravliki dvukhfaznyk sred; sbornik statey, Moscow, Gosenergoizdat, 1961, 128-138

TEXT: A preliminary experiment was necessary to determine the range of heat loads of the heating surface in which film boiling takes place. This was done by taking high speed photographs (4000 exposures per second) from which the nature of boiling could be judged. The central tube was heated with a low voltage current and the air temperature inside it (equal to the temperature of the inner surface) was measured by a thermocouple fixed in the center. In a similar apparatus for tests with vertical tubes, this thermocouple was movable. When the heat load was varied on

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X

Experimental investigation of ...

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the tube, the pressure in the boiler was controlled by use of the compensating heater or the cooler. In testing octanes above 7 kg/cm², the tube was rapidly carburized, and no results at all could be obtained for normal hexane because of soot formation. The coefficient of heat transfer was calculated in the usual way. Heat transfer in film boiling of ethyl alcohol on a horizontal tube having an external diameter of 5.91 mm is given for 5 different pressures. Similar results with horizontal tubes were obtained for octane, iso-octane and carbon tetrachloride. The plots show that the effect of heat load on heat transfer is smaller at higher pressures. In film boiling on a vertical tube, the heat transfer for ethyl alcohol is given. Similar tests were carried out on ethyl ether, normal octane and benzene. Regions of stable and unstable film boiling can be distinguished. Other conditions being equal, coefficients of heat transfer on horizontal and vertical tubes are close in the stable region. There are 12 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: Bromley, Chemical Engineering Progress, 46, 5, 1950.

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S/089/61/011/005/002/017

B102/B101

26.5100
24.5200(1498, 1537)

AUTHORS: Borishanskiy, V. M., Ivashchenko, N. I., Zablotskaya, T. V.

TITLE: Calculation of heat transfer for the case of turbulent flow of liquids for small Prandtl numbers ($Pr \ll 1$) through tubes

PERIODICAL: Atomnaya energiya, v. 11, no. 5, 1961, 426 - 430

TEXT: Some heat-transfer problems are studied theoretically for a turbulent flow of a liquid metal ($Pr \ll 1$) using a three-layer thermal model: (1) laminar boundary layer with molecular heat exchange; (2) intermediate layer with molecular and turbulent heat exchange (boundary layer of liquid); (3) turbulent core of the flow with turbulent heat exchange only. The momentum transfer in this model is calculated according to G. Schlichting (Grenzschichttheorie (Boundary Layer Theory)) using dimensionless coordinates. The boundaries of the zones are calculated under the following assumptions: (1) Dimensionless temperature and velocity differences in the turbulent region are similar: $\varphi = \frac{1}{\kappa} \ln \frac{\eta}{\eta_2}$.

φ is a dimensionless relative temperature (or velocity),

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Calculation of heat transfer...

$\eta = yv^*/a$ (or yv^*/ν), y - distance from the tube wall, v^* - dynamic velocity, a - thermal diffusivity, ν - kinematic viscosity, κ - turbulence, $Pr = \nu/a$. For the turbulent core $yv^*/a = yv^*/\nu$, its boundary is given by $y_{t2} = y_{v2}/Pr$; the subscript t refers to the temperature, v^* to the

"dynamical velocity" $\sqrt{\frac{\tau_w}{\rho}}$ where τ_w the shearing stress on the tube wall

and ρ the density and 2 indicates the boundary of the turbulent core.

S. S. Kutateladze, O. S. Fedynskiy et al. (Zhidkometallicheskiye teplonositeli. Prilozheniye No. 2 k zhurnalu "Atomnaya energiya". M., Atomizdat, 1958) have shown that also for liquid metals the thickness

ratio of dynamic and thermal layers is proportional to $Pr^{1/3}$. So the interface between wall layer and intermediate layer is given by

$y_{t1} = y_{v1}/Pr^{1/3}$, where $y_{v1} = 5\nu/v^*$. The heat transfer coefficients and the temperature field are calculated using the basic relations from Ref.2 (R. Lyon. Chem. Engng. Progr. 47, no.2, 75, 1951). The results:

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Calculation of heat transfer...

$$Nu = \frac{1}{2} \left[\int_0^{\xi_{r2}} \frac{\left(\int_0^{\xi} \omega \xi d\xi \right)^2}{e Pr \frac{\mu_r}{\mu} \xi} d\xi + \int_{\xi_{r2}}^{\xi_{r1}} \frac{\left(\int_0^{\xi} \omega \xi d\xi \right)^2}{\xi \left(1 + e Pr \frac{\mu_r}{\mu} \right)} d\xi + \int_{\xi_{r1}}^1 \frac{\left(\int_0^{\xi} \omega \xi d\xi \right)^2}{\xi} d\xi \right]^{-1} \quad (5)$$

$$\frac{t_{cr} - t}{t_{cr} - t} = Nu \left[\int_0^{\xi_{r2}} \frac{\int_0^{\xi} \omega \xi d\xi}{e Pr \frac{\mu_r}{\mu} \xi} d\xi + \int_{\xi_{r2}}^{\xi_{r1}} \frac{\int_0^{\xi} \omega \xi d\xi}{\xi \left(1 + e Pr \frac{\mu_r}{\mu} \right)} d\xi + \int_{\xi_{r1}}^1 \frac{\int_0^{\xi} \omega \xi d\xi}{\xi} d\xi \right] \quad (6)$$

are confronted graphically with those of calculations for a double-layer thermal model and with experimental investigations. G. N. Kruzhilin (Zh. tekhn. fiz., 6, vyp. 3, 561; vyp. 5, 854, 1936), V. A. Shvab (Tr. Leningradskogo industrial'nogo instituta, vyp. 1, 1937), Ref. 7: V. G. Levich (Fiziko-khimicheskaya gidrodinamika (Physicochemical Hydrodynamics), M. Fizmatgiz, 1958, str. 202), and V. M. Borishanskiy (Vtoroye soveshaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. Tezisy dokladov. Riga, Izd-vo AN Latv. SSR, 1960, str. 81) are mentioned. There are 4 figures and 12 references: 5 Soviet and 7 non-Soviet. The four references to English-language publications read as follows: R. Martinelli.

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Calculation of heat transfer...

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Trans. ASME, 69, No. 8, 947 (1947); R. Lyon. Chem. Engng. Progr., 47, No. 2, 75 (1951); Ref. 9: S. Isakoff, T. Drew. Proceedings of the General Discussion on Heat Transfer, 1951, p. 405; Ref. 10: H. Brown et al. Trans. ASME, 79, No. 2, 279 (1957).

SUBMITTED: December 29, 1960

Fig. 3. Temperature fields calculated (— three-layer model; ---- double-layer model) and measured (o heating of Hg (Ref. 9); + cooling of Hg (Ref. 10)). (a) $Re = 119 \cdot 10^3$, $Pr = 0.0239$; (b) $Re = 290 \cdot 10^3$, $Pr = 0.02$.

Fig. 4. Heat transfer calculated according to Eq. (5) (— three-layer model, ---- double-layer model, Ref. 7) and measured (o, +, as in Fig. 3).

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